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INEQUALITY IN DEVELOPING ECONOMIES: THE ROLE OF INSTITUTIONAL DEVELOPMENT

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Abstract

This paper studies the distributive impact of institutional change in developing countries. In such economies, property rights systems may preserve the interests of an influential minority, who can control key-markets, access to assets and investment opportunities, especially if they enjoy disproportionate political power. We test this hypothesis using cross-section and panel data methods on a sample of low- and middle-income economies from Africa, Asia and Latin America. Results suggest that: (a) increasing property rights protection increases income inequality; (b) this effect is larger in low-democracy environments; (c) few countries have developed political institutions capable of counterbalancing this effect.

Keywords: Inequality, developing economies, institutions, property rights, democracy
JEL: O15, O17, D70

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1. Introduction

The distribution of resources and the rules that govern the economy are central to economic development. Western economies have long undergone economic and political transformations that have delivered a high level of income per capita and almost always socially acceptable levels of income inequality. In developing economies, instead, economic performance reflects institutional arrangements – created in colonial times and inherited by postcolonial states – which are ill-suited for development. Acemoglu, Johnson and Robinson (2005) summarize this research: they trace the primary cause of economic backwardness to the way economic and political institutions function in developing economies. Similarly, Besley and Ghatak (2010) emphasize the importance of property rights. However, while the effects of institutions on national income have been extensively researched, their distributional impact has not received adequate consideration so far.

An assessment of this impact is particularly relevant for developing economies, where a steady concentration of income is often one of the main characteristics.[1] Moreover, such economies have recently started further institutional reforms, which are an ongoing process. Politically, an increasing number of countries have started experimenting with forms of procedural democracy, trying to move away from authoritarian politics and unaccountable governments, especially in the post Cold War era (when electoral competition was introduced). Economically, production and exchange mechanisms have mirrored those of richer economies, with reforms such as increased privatization and deregulation. These reforms and how they relate to historical institutions must have an impact on efficiency. But what are the effects on equity? We do not know a great deal about the distributional consequences of institutional change. While this might not be an issue in developed

[1] Descriptive statistics on inequality suggest that the mean Gini index in developing economies is 49.76 (with an overall standard deviation of 10.12); while in Western OECD economies it is 32.17 (with an overall standard

economies, where institutions are stable and consolidated, such consequences could be relevant in less developed economies, where institutional failure is by far more frequent and extensive. In fact, the issue of institutional development, especially clearly defined property rights, is high on the agenda of development scholars and policy makers alike.[2]

The principles of economics of inequality suggest that the possibility of acquiring factors of production, the right to any benefit from them and their initial endowment (as well as the ability to increase one's marginal productivity) determine individual incomes (see Champernowne and Cowell 1998). Institutions governing economic and political processes affect this income because they mould individual's incentives and constrain the range of activities they can undertake. Such institutions include the rules that shape property rights protection. These rules, both formal and informal, define and protect private property and enhance the ability to appropriate returns from ownership and the use of factors of production. Taxation and wage-setting policies, strategies that promote (or hinder) the acquisition of skills amongst different sectors of the population, and access to markets are all potential channels through which property rights regimes affect agents' capability to earn and appropriate income from the production factors they own.

This paper uses both cross-section and panel data methods to empirically investigate the effect of property rights protection on income inequality in developing countries. Such institutions can exacerbate inequality if they are conceived to preserve or increase the economic interests of the privileged elite. For instance, Acemoglu (2008) argued that property rights can also be protected by erecting entry barriers, setting favorable tax regimes,

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deviation of 6.76) for the period 1960-2004.

or weakening the risk of expropriation of productive assets by controlling the political system, as well as engaging in rent-seeking activities. In all these cases, resulting property rights institutions may become inequitable. Unlike previous literature, we account for the interaction between political and economic institutions. In particular, we highlight that an environment where property rules are inequitable is more likely to occur in countries where political power is disproportionately allocated to oligarchies. In developing economies, an undemocratic power structure could prevent such economies from building an institutional apparatus that can disperse the concentration of income. This phenomenon could be prominent in many ex-colonies, where economic institutions may be the cause of high and persistent inequality.

An assessment of the impact of economic institutions on income inequality is useful to understand reforms aimed at creating investment incentives or extending economic opportunities for low-income groups (for example, access to and control of factors of production and workers rights to organize and bargain). The paper also provides novel evidence on the relationship between political systems and economic inequality. The standard argument would suggest that democratic politics may increase redistributive expenditure (see Gradstein and Milanovic 2004, and references therein). Democratization can, instead, affect the level of income inequality 'indirectly' by changing the functioning of property rights institutions.[3]

This is consistent with recent literature on the determinants of inequality.

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[2] In Western OECD economies, the Fraser property rights index is 8.38, with a standard deviation of 1.01 over the 1996-2000 period, and the 1981-1985 mean is of 7.22, with a standard deviation of 0.74. However, in developing economies, the 1996-2000 mean Fraser property rights index is 4.87, with a standard deviation of 1.07, against a 1981-1985 mean of 4.06 with a standard deviation of 1.42. Similarly, in Western OECD economies, the Vanhanen democracy index is 33.61 (standard deviation of 6.31) over the 1996-2000 period and the 1981-1985 mean is of 31.05, with a standard deviation of 8.60. In developing economies, the 1996-2000 Vanhanen democracy index is 11.58 with a standard deviation of 8.74, compared with a 1981-1985 mean of 5.16 and a standard deviation of 6.72.

[3] Some recent research also proposes that the effect of economic freedom on women's welfare (Stroup, 2008), as captured by female literacy and life expectancy, and on health education and disease prevention measures can

Bourguignon et al. (2007: 250-253) call for a systematic analysis of the effect of institutions, in the current and future research agenda on the persistence of inequality. Bowles (2004) has coined the expression "institutional poverty traps" to refer to institutional arrangements that engender inequality.[4] This paper is related to the debate on the evolution of inequality during the process of development. A perennial question in the study of income inequality is: Does inequality have an inverted-U pattern as output increases? (see, for example, Milanovic, 2000). Recent literature suggests that the actual trajectory of inequality could depend on institutional arrangements adopted by governments, which distribute the gains of economic growth across the population (Acemoglu and Robinson 2002; Piketty 2006).[5] This paper also relates to the debate on the impact of *economic freedom*. The evidence for the existence of a trade-off between *economic freedom* and equality has been mixed so far (Berggren 1999; Carter 2006; Scully 2002). Thus, we try to shed further light by studying in depth the role of property rights protection, i.e., its most fundamental facet. Finally, the paper contributes to the broader literature which investigates the determinants of income distribution within and across countries, as suggested by Atkinson (1997). For example, cross-national studies have emphasized the role of democratization, financial development and education (Li, Squire and Zou 1998) and more recently the role of colonialism (Angeles 2007) and factor rewards, especially the share of labor (Daudey and García-Peñalosa 2007).

The paper is structured as follows: Section 2 discusses the hypotheses to be empirically investigated; Section 3 formulates the econometric model and also introduces the data used; and section 4 presents the results. The final section summarizes and speculates on the implications of this empirical analysis.

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be conditional on the type of political system (Stroup 2007).

[4] The role of institutions is emphasized also by Atkinson (1997), stressing the role of social customs and norms.

[5] Acemoglu and Robinson (2002) formalized the idea that inequality could be the result of institutional transformation which encourages redistribution and is forced by the threat of social unrest. Sustained social mobilization channeled Western economies on an inverted-U pattern, while some economies in sub-Saharan Africa and Latin America have experienced an 'autocratic disaster'.

2. Inequality and institutions: hypotheses and empirical literature

2.1 Hypotheses

Does a higher level of property rights protection increase or decrease inequality in developing economies? Institutions establishing and enforcing private property rights could favor particular social groups, e.g., the political and economic elite. Some literature argues along these lines and outlines the following causal mechanism: the presence and exploitation of factor endowments in many colonial economies - such as labor abundance, natural resources and soil suitability for cash crops and substantial economies of scale - explains extreme levels of historical inequality in income, human capital and political power. Such historical conditions enabled colonial elites to establish an institutional structure that secured investment returns for themselves, thus reinforcing income inequality over time. This state of affairs did not change after the end of colonialism and the institutional structures of post-colonial states have contributed to this persistence of inequality.

Angeles (2007) postulates, and provides econometric evidence, that the presence of a European minority is associated with production systems aimed at exploiting native populations (and is a robust predictor of current income inequality in pooled OLS regressions).[6] Some historical studies have documented how forms of inequitable institutions arose in many Latin American and sub-Saharan African economies. In order to exploit natural resources, labor abundance and soil fertility, colonizers established exploitative institutions in many areas of Latin America and the Caribbean. Property relations created and perpetuated the concentration of income and wealth in economies which were rich in

[6] For example, in South Africa, where the British and Afrikaners dominated the agricultural and mining resources, rules were in put into place to prohibit the acquisition of land by natives (and the situation did not change when political power passed onto European descendants following independence). Jolly (2006) observes that in developing economies inequalities of landholdings, mine or forest resources are high because at the time of independence, constitutions often prevent property disputes (or only allow this if there is to be a full compensation). In other cases, property rights (for example, mining royalties) have been allocated either through political connections or by subverting the political system (e.g., mounting a coup d'état).

minerals or had suitable soil to produce large plantations of cash crops (e.g., sugar, coffee, and bananas) using forced labor. Examples of these are found in Brazil, El Salvador, Guatemala and the Caribbean islands, but also in Mexico, Peru and Bolivia (Engerman and Sokoloff 2005).[7] Similarly, inequality in sub-Saharan Africa may have resulted from economic institutions that, shaped by colonial states, granted advantages to specific groups, rather than a broad cross-section of the population (van de Walle 2009). Morrisson (2006) showed that the existence of dualistic structures in colonial and postcolonial Senegal and Kenya has kept inequality high, while Ghana had such taxation and labor markets that inequality was low. In some other areas of sub-Saharan Africa, the functioning of agricultural markets and the extraction of natural resources was distorted in favor of specific groups, primarily the political and economic urban elite and their clientele. Small-scale farmers were compelled to sell their crops through state marketing boards at prices below market level (Bates 1988). The presence of natural wealth, whether controlled by a state-owned or private enterprise, co-exists with institutional systems that allow the elite to extract rents (Milanovic 2003).[8]

Following this literature, one can hypothesize that the rules governing access to and the reward of production factors in developing economies were created and function in order to protect the interests of an influential minority. Hence, the corresponding testable hypothesis is that property rights protection has contributed to the increase in inequality. However, before turning to this, we have to discuss the role of political systems. Considering

[7] This also resulted in societies where political power ensured the elite had a disproportionate influence on the economy. The voting population has historically been very low; franchises have been granted according to wealth and literacy requirements; and a lack of secrecy of vote have all been recurring features of political systems in the region (Engerman and Sokoloff 2005).

[8] Such phenomena may not be so pervasive in south and east Asia (quite exceptional is the case of Taiwan and South Korea, where land inequality decreased substantially). Acemoglu and Robinson (2002) define the 'East Asian miracle' phenomena of 'growth with equity' in Asia (as opposed to the 'growth with inequality' in Latin America and the recent increase in economic inequality in Western Countries, e.g., Britain and USA). Bardhan (2005) observes that cultural values in India and China translated into formal and informal rules that made such societies relatively more egalitarian (e.g.,, the absence of the law of primogeniture has contributed to keep low

the intensity of private property rights protection may be insufficient without bringing into the analysis the idea that legal institutions – through which property rights are defined, have allocated and (finally) enforced – reflect the distribution of political power. In this respect, political theory and legal studies scholars have long argued that such legal institutions arise as the outcome of political struggle and bargaining over institutional change (e.g., Sened 1997; Libecap 1989; Kennedy 2009). The concentration of political power is, in turn, expressed by the existence and consolidation of political democracy. Hence, we argue that the distributional impact of property rights protection should also be assessed considering its interplay with democracy.

Democratization, e.g., extending the franchise, is expected to deliver a reduction in inequality. If the median voter shifts the income distribution below the mean income one should expect higher taxation, and more redistributive policies. The amount will be proportional to the level of inequality prior to democratization, i.e., the initial number of poor. Yet, such mechanisms are not consistent with the experiences of developing economies. In fact, econometric studies do not find a robust correlation between the two variables (see, for a recent review, Gradstein and Milanovic 2004) and some evidence indicates that the effect of inequality could be nonlinear, following an inverse U-shape relationship which is positive in developing economies and negative in developed ones (Chong 2004; Tam 2008).[9] This state of affairs is a stimulus to consider other types of redistributive effects. For example, the redistributive role of democratization could be 'indirect', rather than working directly through redistributive public expenditure.

Here, we consider and test the idea that a democratic political system could be a

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land inequality). Perhaps not negligible is also East Asia's reduced importance of cash crops and mineral resources, exceptions being plantation economies such as Sri Lanka and The Philippines.

[9] Democratic practice in developed democracies has produced less redistribution than theory predicted. Such economies display more inequality than should be expected, according to the median voter theorem, although regarded as within socially acceptable limits. A rich literature attempts to explain this 'paradox'. Some arguments have suggested that the wealthy can bribe the small segment of voters with incomes between the

necessary condition to change property relations so that less well-off social groups can appropriate a higher income from the production factors they own. Acemoglu (2008) has suggested that the property rights institutions in democratic environments work differently than in oligarchic ones. One channel is the regulation of entry into markets. In oligarchic societies, the dominant economic elite has enough political power to control key-markets by erecting entry barriers (e.g., through direct regulation, but also obtaining subsidized credit or inputs), as well as protecting themselves from expropriation and redistributive taxation, thus granting themselves better opportunities to benefit from the ownership of production factors. A second channel concerns wage-setting policies. Rodrik (1999) and Robinson (2001) have argued, and provided evidence, that democracies redistribute by increasing the wages share through reforms of labor market institutions: e.g., workers have the right to organize to increase their bargaining power; there are higher minimum wages and more favorable hiring and firing practices. Unlike democratic societies, economic institutions in oligarchic societies provide limited property rights protection to certain social groups and worse distributional outcomes. The reverse may happen as countries democratize because there are two inherent characteristics of democracy that make it able to modify the functioning of property rights institutions: political representation, through competing political parties, and participation, through voting. Both of them enhance the capability of low-income social groups to organize and force the elite to reform institutions so that inequality may fall (Rodrik 1999; and Robinson 2001).

Our hypothesis is that developing economies might have, in most cases, established property rights institutions that reflect the unequal balance of political power. However, economic inequality is also explained by the interplay of political and economic institutions. Economic institutions enable narrower or broader property rights protection, depending on

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median and the mean, to resist the temptation of supporting confiscatory taxation (Breyer and Ursprung 1998).

how inclusive the political system is. Hence, the distributional effects of property rights protection can differ depending on the stage of democratization.

2.2 Empirical literature

Cross-national investigations on the determinants of economic inequality in developing countries are sparse (an exception is Milanovic 2003) and the role of economic institutions has not been systematically addressed. Perhaps this is, in part, due to the limited availability of inequality data on developing economies. There are, however, few studies that consider the distributive impact of institutions in the broader cross-national context. Berggren (1999) provides an early assessment, focusing on the broader concept of *economic freedom,* and finding some evidence that increasingly it can reduce income inequality. But the findings are later revisited, raising the issue whether a trade-off exists between them (Scully 2002; Carter 2006). Chong and Calderon (2000), taking a cross-sectional approach with a sample covering 70 developed as well as developing countries, show that institutional quality, measured by a composite index based on political risk data by International Country Risk Guide (ICRG) and the Business Environmental Risk Intelligence (BERI)[10], displays a quadratic relationship with income inequality. For poor economies, institutional quality is positively linked with income inequality, but the opposite is true for rich economies. Another cross-section study, on the other hand, finds a statistically insignificant impact for institutions with OLS regressions using a linear specification (Sylwester 2004).[11] Chong and Gradstein (2007) study – using a large panel of countries and controlling for unobserved heterogeneity – the correlation between income inequality and a number of institutional indicators, capturing democratic and institutional stability aspects. They find that 'better' institutions

[10] From ICRG: (i) 'risk of expropriation'; (ii) 'repudiation of contracts by government'; (iii) 'law and order tradition'; (iv) 'corruption in government'; and (v) 'quality of bureaucracy'. From BERI: (i) 'contract enforceability'; (ii) 'nationalization potential'; (iii) 'bureaucratic delays'; and (iv) 'infrastructure quality'.
[11] On a sample of ex-colonies (including USA, Canada, Australia and New Zealand), and using a composite index of institutional development (consisting of political rights and civil liberties, political stability,

predict a reduction in income inequality, as well as increasing inequality predicting poorer institutional quality.[12]

The above empirical research has tended to treat institutions as an indistinct body so far, while it could be insightful to disentangle the impact of political and economic institutions. Here, we intend to fill this gap. Political systems may have a distinct role from economic institutions. Democracy can directly affect economic inequality, but it also moulds economic institutions by including or excluding the citizens from the political process which builds economic systems. Hence, the functioning of property rights institutions could be linked to the nature of the political system.

3. Econometric methods and data

Regressions based on cross-section averages can be a suitable tool to test relationships whose mechanisms have long run characteristics, as argued in Easterly (2007).[13] In this case, we analyze how political and institutional development has contributed to present-day inequalities (e.g., post-colonial, or even colonial, history). Hence, an empirical counterpart to the foregoing ideas can initially take the following functional form:

$$Ineq_{i,T,T-1} = \beta_0 + \beta_1 \cdot I_{i,t,t-1} + \beta_2 \cdot Q_{i,t,t-1} + X'_{i,t,t-1} \cdot \phi + \varepsilon_{i,t,t-1} \qquad (1)$$

Where, $Ineq_{i,T,T-1}$ is the average inequality index of interest for country *i* between the end of the sample period, *T*, and *T-1*. $Q_{i,t,t-1}$ is a measure of economic institutions, i.e., clarity of property rights, for country *i* between times *t* and *t-1,* with $t<T-1$. Such choice of period attenuates problems of reverse causality that might cloud the inference about property rights. Similarly, the level of political democracy is $I_{i,t,t-1}$. In practice, a suitable response variable

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government effectiveness, limits to government regulation and adherence to the rule of law).

[12] They use Freedom House political rights and civil liberties indices; and 'rule of law', 'corruption', 'government stability', 'bureaucratic quality' and 'democratic accountability' from ICRG.

[13] Contributions following this strategy are Chong and Calderon (2000) and Daudey and García-Peñalosa (2007).

can be the Gini coefficient measured as the average of the observations available from 1991 to the end of the sample period, while we use averages over earlier periods of both democracy and of the available observations of the property rights rating. The coefficient β_1 and β_2 can be interpreted, respectively, as the long run effect of democratic and property rights consolidation on income inequality.

$X_{i,t,t-1}$ is a set (kx1 vector) of controls. Following Li, Squire and Zou (1998), we control for education, land inequality and the level of financial development (a set of inequality determinants whose effects, as we shall test, could also be depending on the level of democratization). The average level of education provides a greater supply of skilled labor, which tends to reduce the skill premium and hence reduces inequality in the distribution of labor incomes. Land inequality and the level of financial development capture the inequality of assets: how difficult it is to access credit for the poor, who lack collateral. We also control for regional dummies to capture unobserved regional effects; other long-run determinants of inequality, which include the level of economic development – measured by GDP per capita to capture economy-size effects – and its square, to capture Kuznets curve-type effects; and inflation, which hits the poor harder, as they are normally unable to hedge against it. Equation (1) also conditions on the suitability of land for wheat versus sugarcane, which, as elaborated by Easterly (2007), is exogenous and picks the historical variation of inequality.
Finally, $\varepsilon_{i,t,t-1}$ is the error, capturing all other omitted factors.

Following on from the foregoing discussion, inequality can be modeled allowing for interaction effects:

$$Ineq_{i,T,T-1} = \beta_0 + \beta_1 \cdot I_{i,t,t-1} + \beta_2 \cdot Q_{i,t,t-1} + \beta_3 \cdot \left(Q_{i,t,t-1} \cdot I_{i,t,t-1}\right) + X'_{i,t,t-1} \cdot \phi + \varepsilon_{i,t,t-1} \qquad (2)$$

Equation (2) admits that the estimated parameters of democracy and property rights can be heterogeneous across the population (interaction terms are one way to account for that). The partial effect of property rights institutions is now conditional on democratic

consolidation: $\partial Ineq / \partial Q = \beta_2 + \beta_3 \cdot I_{i,t,t-1}$. In particular, β_2 is the impact of one unit change in property rights institutions on income inequality when democracy is zero. We expect that stronger property rights protection increases income inequality, β_2 is positive. Such effect is moderated by increased democratization as this process modifies the functioning of property rights, as hypothesized in section 2; therefore, β_3 is expected to take a negative sign. However, from estimating (2) alone we cannot observe if economic institutions have a significant effect on inequality when democracy is not zero, although all these cases can be very informative. Thus, for a full interpretation of the partial effects, we have to plug in the values of democracy and then recalculate standard errors and significance of the resulting marginal effect.

Relying on the cross-section approach – as in (1) and (2) – would enable us to tell which countries adopt inequitable economic institutions based on political choices rooted in (recent) history. And this is consistent with literature attempting to explain this type of long-run phenomena. The potential consequence of averaging the variables over years is that it tends to obscure episodes of political and institutional change within countries which should be reflected in a subsequent change in the distribution of resources. For example, such an approach does not capture the likely effects of episodes of political reforms towards democratization over time or, vice versa, of reversions to authoritarianism (e.g., some Latin American nations). If this is the case, one could complement the evidence from cross-section regressions based on averages with a panel approach, as it can validate such results if we concentrate on the *within* variation. A causal link between property rights and inequality suggests that we should also see a relationship between changes in property rights and changes in income inequality. Put differently, we should be able to ask: does income concentration (with its other characteristics held constant) become higher *when* its legal system increases private property protection? To answer such a question, one has to

investigate whether the cross-sectional relationship between the variables of interest disappears when country fixed effects are included in the regression, thus removing the long-run determinants of both property rights protection and inequality that are time-invariant. Furthermore, we can minimize the confounding effect of omitted variables by controlling for common trends, e.g., the decades since the late 1970s have witnessed world-wide economic and political shocks.

In practice, such an approach may not be as effective as expected. The causal mechanisms and variables under scrutiny have long-run features and evolve slowly over time. The available data structure, as we shall discuss below, is not best-suited for this type of analysis. The time dimension of the available panel of developing economies is such that, while property rights and democracy show enough variability over time, inequality tends to change significantly across countries, but little over time. Hence, procedures that remove the effects of time invariant factors also remove most of the variation that one wishes to explain. Notwithstanding, we attempt to investigate the short-run behavior of the relationships under scrutiny by exploiting *within* country variation, even though, as we shall argue, results should be treated with caution. This requires estimating the relationships of interest using the Fixed Effects (FE) estimator, which is entirely based on time-series variation (e.g., as captured by deviations from individual means, *Within estimator*).

3.1 Data

This study uses aggregate data at country level. The sample is composed of sixty-three developing countries (which are not transition economies), defined as low- and middle-income economies in South and Central America, sub-Saharan Africa, North Africa and the Middle East and Asia. The data appendix provides a list, divided by regions.

Our preferred measure of protection of private property rights is extracted from the *Fraser Economic Freedom* index. In its recent denomination, the *Legal Structure and*

Security of Property Rights is a continuous variable ranging between one and ten; a higher score corresponds to a better protection of private property rights. As far as we are aware, this variable has the longest time span – having been recorded every five years from 1970 until 2000 (and every year from 2001 on) – for a large number of developing economies. This makes it crucial to conduct panel data analysis. The Fraser property rights index is a *subjective* measure and expresses experts' judgments on the property rights protection for foreign investors and the business community, which may or may not coincide with the perceptions of property rights protection among citizens at large. Isaksson (2010), for example, has argued that it would be far-fetched to assume so, since it is based on surveys of a small cross-section of economic actors. The Fraser property rights index is not designed for such a purpose (neither are its sources, or alternative indices) and, hence, carries no information on the within-country variability of property rights protection across groups (see Isaksson 2010, and Lawson-Remer 2010). In other words, such an index does not express the inclusiveness of property rights protection (e.g., rich and poor, peasants and big corporations, men and women, diverse ethnic groups, etc.). [14]

[14] It has been assembled over the years from different sources – essentially, but not exclusively, the International Country Risk Guide, the Business Environment Risk Intelligence, and the Global Competitiveness Report – and has undergone some changes in definition, although the underlying concept remains unchanged (see, for information, the various *Economic Freedom of the World Reports,* e.g., Gwartney and Lawson 2007). It includes: **(a)** Judicial independence (from GCR): the judiciary is independent and not subject to interference by the government or parties in dispute (This component is from the *Global Competitiveness Report*'s question: "Is the judiciary in your country independent from political influences of members of government, citizens, or firms? No—heavily influenced (=1) or Yes—entirely independent (=7)." See World Economic Forum, *Global Competitiveness Report* (various issues), at http://www.weforum.org/en/initiatives/gcp/index.htm). **(b)** Impartial courts (from GCR): a trusted legal framework exists for private businesses to challenge the legality of government actions or regulation (this component is from the *Global Competitiveness Report*'s question: "The legal framework in your country for private businesses to settle disputes and challenge the legality of government actions and/or regulations is inefficient and subject to manipulation (=1) or is efficient and follows a clear, neutral process (=7)." **(c)** Protection of property rights (from GCR): this component is from the *Global Competitiveness Report*'s question: "Property rights, including over financial assets are poorly defined and not protected by law (=1) or are clearly defined and well protected by law (=7)." **(d)** Military interference in the rule of law and the political process (from ICRG); this component is based on the *International Country Risk Guide*'s Political Risk Component *Military in Politics*: "A measure of the military's involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement in government might stem because of an actual or created internal or external threat. Such a situation would imply the distortion of government policy in order to meet this threat, for example by increasing the defense budget at the expense of other budget allocations. In some countries, the threat of military

Given the hypotheses we endeavor to test, this feature does not make it unsuitable, quite the opposite. The paper tries to establish if the existing property rights institutions increase income inequality by favoring specific social groups in developing economies, rather than protecting everybody's capability to appropriate returns from the production factors they own. Its companion hypothesis is that the distributive effect of increasing the level of property rights protection is expected to be heterogeneous, depending on changes in the political system. This is because the level of political democracy improves the inclusiveness of property rights institutions. In this case, the more the property rights index takes this inclusiveness into account, the less the observed parameter heterogeneity of the effect of property rights would be (with increased democratization). If we had a property rights proxy that perfectly captures property rights protection for society as a whole, perhaps we would observe no parameter heterogeneity.

As a democratization measure, we utilize the index by Vanhanen (2000), which is a continuous variable, taking values greater or equal to zero, and is computed by multiplying, and dividing by 100, two indices (with equal weight): *competition* and *participation*.[15] Our choice is justified by the fact that Vanhanen's Index presents four properties that make it suitable for our research question: (i) it is an *objective* index, hence it is not affected by analysts' explicit inclusion or individual bias toward the existence and protection of private property rights as a defining attribute of political democracy (while this is the case, e.g., of

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take-over can force an elected government to change policy or cause its replacement by another government more amenable to the military's wishes. A military takeover or threat of a takeover may also represent a high risk if it is an indication that the government is unable to function effectively and that the country therefore has an uneasy environment for foreign businesses. A full-scale military regime poses the greatest risk. In the short term a military regime may provide a new stability and thus reduce business risks. However, in the longer term the risk will almost certainly rise, partly because the system of governance will be become corrupt and partly because the continuation of such a government is likely to create an armed opposition." **(e)** Rule of law (from ICRG, see above): it is defined as *integrity of the legal system*, i.e., strength and impartiality of the legal system and popular observance of the law.

[15] *Competition* is calculated by subtracting the percentage of votes won by the largest party from 100 (i.e., the smaller parties' share of the votes cast in parliamentary or presidential elections). If data on the distribution of votes are not available, this variable is calculated on the basis of the distribution of seats in parliament. *Participation* is calculated as the share of population that actually votes as a percentage of total population.

the Freedom House Civil Liberties Index); (ii) it is continuous, thus capturing the fact that (unlike its dichotomous alternatives) political systems in developing economies are a mixture of democratic and authoritarian practices; most developing economies are also 'developing democracies', as the democratic transition is still unraveling; (iii) it has the nice property of taking into account citizens' participation in the democratic process (unlike its alternatives), which testifies of the real extent to which political power is equally shared and the strength of elite privileges, as the argument of our paper suggests; (iv) it adopts a minimalist definition, in line with many others, which captures the few necessary attributes of a procedural democracy.

To measure income inequality, our preferred index is the Gini coefficient. Although UNU-WIDER (2007) offered a higher quality dataset, the World Income Inequality Database (WIID), one must address the well-known comparability problems that exist when using cross-national databases of income inequality. After selecting and adjusting the available observations to make them as consistent as possible, we obtained estimates of the Gini coefficient of disposable household income. From the version 2b of the WIID, we first delete all observations for which the underlying notion of income or earnings is unknown or incomplete ('quality 4' data, the lowest ranking), and thus we only use the top three rankings. To maximize the comparability over time, within each country, we have adopted the following procedure: we formed a series for each country by keeping the observations from the same source and survey, which represented the majority of observations for the country. In this way, we are confident that the Gini coefficients (but also quintiles and deciles) coming from WIID are as comparable as possible – at least as far as the time dimension is concerned, which is crucial in panel FE models – because known and unknown methodological differences are potentially accounted for.[16] Of course, this only holds true if one assumes that

[16] We followed an initial suggestion by Luis Angeles, to whom we are grateful.

there have been no changes in the survey methodology used to construct each country series – or if any changes occurred, they have had little effect. However, this also means discarding a great deal of information. Thus, for the majority of developing economies we obtain few data points. Then, each selected series was supplemented with observations originating from other surveys (rather than the survey with the majority of observations) where at least income definition and the income sharing unit are equivalent, and the area and population coverage are most extensive. As indicated in the database manual revision notes (UNU/WIDER 2007), for Latin American countries we kept the observations computed by SEDLAC, as they already display a good degree of harmonization. The procedure, as it is, ensures that inequality measures are as comparable as possible within each country, but leaves us with the problem that they are not comparable amongst different countries. This could result in erroneous comparisons if one wishes to compare developing countries. Hence, the next step is to amend the above series in a way that they become comparable across countries. Following the 'traditional' approach, major sources of incomparability across countries have been deal with by regressing the observed values against dummies for gross income and earnings, expenditure and consumption, and person as a reference unit. This produces the correction factors (which are 7.15, -3.68, -1.27, 3.87 and -0.37, respectively) which we use to normalize each data point (obtaining Gini coefficient estimates based on disposable household income).

Large and updated land inequality data has remained scarce. Nevertheless, Easterly (2007) has recently suggested the use of the *share of agricultural land occupied by family farms* – recorded every ten years from 1858 to 1998 – assembled from many different sources by Vanhanen (2005), which is a proxy of land and asset inequality. In panel regressions, its data points are too few to yield a meaningful sample size. However, we can exploit another proxy for asset inequality. Despite some data quality issues, Castelló and Doménech (2002)

constructed measures of human capital inequality for a panel of 108 countries. Taking attainment levels (average schooling years of the population aged 15 years and over) from Barro and Lee (2001), they compute Gini coefficients and the distribution of education by quintiles over five-year intervals from 1960 to 2000.

Our dataset is completed with the secondary enrolment rate by Barro and Lee (2001), and some macroeconomic variables from the World Development Indicators (World Bank, 2007): annual inflation (consumer price index), GDP per capita, and the ratio of a measure of money supply (monetary aggregate M2) on GDP, capturing the level of financial development.

4. Empirical analysis

4.1 Cross-section evidence

Figure 1 plots the Gini-WIID average of the available observations from 1991 to 2000 and of the democratization index averaged over 1960-1990 – where the vertical and horizontal lines are the averages of Gini index (at 45.52) and democratization (at 5.44). The regression line has a coefficient of 0.017, and a t-ratio = 0.11 (R-squared = 0.0002, 58 countries). The regression line essentially overlaps with the mean. Hence, there seems to be weak correlation between the development of democratic systems and income inequality.

Figure 1 [about here]

Figure 2 [about here]

How do property rights correlate with income inequality instead? In figure 2, the scatter plot of the Gini index against the property rights index (respective averages are 45.52 and 4.11) – taken as an average of the available observations from the 1980s to 1990 – shows a moderate, positive correlation, with an estimated coefficient of 1.621, t-ratio=2.02 (R^2=0.061, 47 countries). However, when splitting the sample according to the mean (5.44) of the 1960-1990 average of Vanhanen's democracy index, we find that the slope can be quite

pronounced in countries below the democracy average (dots), while in countries scoring above such value (squares), the slope of the regression line switches to negative. Figure 3 suggests that the relationship between income inequality and the protection of private property in developing economies could be a nonlinear one. Cross-section regressions will document if this is the case.

Figure 3 [about here]

Table 1 reports the results. The dependent variable is income inequality measured as the average of available observations from 1991-2000. We first run an OLS regression where the 1980-90 average of property rights and the 1960-90 average democracy enter in linear form, together with the initial values of other determinants of income inequality (taken in the years they are most available for developing economies): land inequality, level of education, financial development and GDP per capita (in log form). The property rights coefficient is insignificant at conventional levels. But the effect of political and economic institutions on inequality could be more nuanced. When adding the Democratization-Property rights interaction term, the results change. Both the property rights coefficient, β_2, and the interaction term coefficient, β_3, are highly significant. The goodness of fit improves. A linear restrictions test of the joint significance of β_2 and β_3 rejects the null of both being zero at 1% confidence level (also in all the remaining regressions). The third and fourth columns verify that this is not the result of omitted variables, where the coefficients of interest are picking the effect of historical or region-specific factors. Introducing regional dummies and the (natural log of) wheat/sugar ratio, proposed by Easterly (2007) to capture historical conditions determining inequality, does not alter the results.[17] The fifth column re-estimates the model using robust regression methods, providing initial evidence that outliers are not actually driving the key results, while the last two regressions introduce alternative

[17] Based on FAO data, it expresses the suitability of land to sugar versus wheat cultivation and is defined as

democracy and property rights measures and re-estimate the model using OLS and robust regression.[18] Utilizing the *Political Rights* index by Freedom House and the property rights index based on data from the International Country Risk Guide (produced by Political Risk Services and available only from 1984 to 1997) does not affect our key results (magnitudes are different due to different scales).

Table 1 [about here]

Perhaps the most interesting implications arise from the joint interpretation of magnitude and sign of β_2 and β_3. Following the fourth model, β_2 shows that a one point increase in the property rights score triggers an increase income inequality Gini index of 2.166 points, when democracy scores zero. The ongoing system of property rights will increase inequality, in autocratic regimes. Although empirically relevant (as six countries score zero democratization), this must be supplemented with an assessment when democracy takes values greater than zero. In figure 4, we report the partial effects estimated at the observed values of the 1960-1990 democratization index in the sample (continuous line, where each dot is the country's partial effect) and their statistical significance (95% confidence intervals, with a dashed line). For the majority of the countries there is a positive and significant effect of property rights of inequality (significant at least at 5% confidence level) and its value ranges, approximately, from 1.2 to 2.2 Gini points for a one-unit increase in property rights, which seems sizable (the Fraser property rights index has a standard deviation of 1.26).[19] Figure 4 also shows that countries with more democratic political institutions are able to mitigate first, and then reverse the marginal effect sign from positive

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ln(wheat/sugar)=ln[(1+share of arable land suitable for wheat)/(1+share of arable land suitable for sugarcane)].

[18] We perform Iteratively Reweighted Least Squares (IRLS), which works iteratively by first calculating a measure of influential observations (Cook's distance) and excluding any observation for which such measure is greater than 1. It then performs a regression, calculates case weights based on absolute residuals, and regresses again using those weights. Iteration stops when the maximum change in weights drops below a given tolerance level. We use the default 0.001.

[19] Some countries which fall within this group are Sub-Saharan African economies – e.g., Zimbabwe, Congo (Rep.), Tanzania, South Africa, Kenya, Zambia – and Latin American countries, e.g., Haiti, Panama, Chile,

to negative, thus reducing inequality. A second group of countries falls within the region bounded between the two 5% confidence lines of the graph, where the calculated marginal effect is statistically not different from zero.[20] Finally, only a handful countries seem to have created political systems such that the partial effect of economic institutions is reversed and shows a negative sign. In this small group of countries we find India, which is an established democracy. Uruguay, Venezuela and Costa Rica also lie within this area. However, the significance of partial effects for such economies (with a more consolidated democracy) is marginal (10% level), at best.

Figure 4 [about here]

4.1.1 Robustness checks

We have experimented with a number of other controls: the square of per capita GDP (to capture the likely existence of a Kuznets curve), inflation, and share of major religions. We have also checked the robustness to an alternative democratization index, using *Polity2* index (from Polity IV project). The signs and significance of coefficients of interest do not change.

It is also important to investigate further if our inference about the population of developing countries might be affected by outlying observations or a few leverage data points, thus casting doubt on the generality of the results. Therefore, we performed formal checks for influential observations based on popular techniques that can identify countries with either a high leverage or large residuals. We have calculated leverage measures based on hat values, Cook's Distance – considering points with high influence the ones higher than $F_{0.5;\, k,\, (n-k)}$ – and the DFITS statistic, taking as a threshold $\left|DFITS_j\right| > 2\sqrt{k/N}$. We used them jointly to detect countries that result as influential in more than one measure. Regressions

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Paraguay and Nicaragua. Asian countries in this group are Indonesia, Pakistan and Bangladesh.

[20] In particular, countries scoring a democracy level approximately equal to four (out of 21.82, the maximum)

excluding (up to five) countries with highest values in leverage measures do not significantly change our results.

Next, we have checked to what extent influential observations affect the magnitude of specific coefficients, property rights protection and its interaction with democracy, by calculating a DFBETA statistic. In this case too, results do not show any sensible change by excluding values that are above the cut-off $\left|DFBETA_j\right| > 2\sqrt{N}$ from the regression. In particular, countries that seem to be potentially influential for the property rights coefficient are The Philippines, Ghana and Jamaica; and Venezuela, for the interaction term coefficient. However, our estimates show little sensitivity once removed from the regressions.

Table 2 [about here]

Our last robustness test is to exclude each continent from the regression, in turn, to check if any of them drives the results. Table 2 reports the results when using, for example, *Political Rights* and ICRG property rights scores. The signs of the coefficients of interest do not change, although one could have expected the results to be sensitive to the presence of Latin American economies. Magnitudes (and significance) are sensitive to including Sub-Saharan Africa in the sample. However, we estimate the same model with much less information of data, which does result in a loss of precision.

4.2 Panel data evidence

Results based on cross-section averages suggest that countries with stronger property rights protection have higher income inequality, and this is particularly large in low-democracy environments. This also signals that political democracy could 'indirectly' affect the concentration of income in a market economy, by affecting the functioning of rules that protect and enforce property rights, although only few developing economies have levels of democratization high enough to counterbalance such effect. The complement to this analysis

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are sufficiently democratic to neutralize the inequality-worsening effect of property rights.

is to investigate the existence of a relationship between changes in property rights protection and changes in income inequality (bearing in mind the aforementioned methodological caveats on the effectiveness of panel data).

The panel has an unbalanced and unequally spaced structure, spanning from 1970 to 2004. We average our series over 5-year periods (1970-1974, 1975-1979 and so on). But property rights scores (by Fraser institute), the proxy for asset (human capital) inequality, and education data are originally recorded at the very beginning of every 5-year episode (1970, 1975 and so on). The descriptive statistics (reported in the appendix) show that the time dimension of the key variables is short (average T is less than three for both inequality and property rights). A significant part of the variation in property rights and democracy occurs within countries (they exhibit similar standard deviations across and within countries). Income inequality, instead, exhibits much variation across countries and little over time (in line with previous literature, e.g., Li et al, 1998), meaning that sharp changes are unlikely. It is a persistent phenomenon, which one has to control for.[21] Hence, we recast the cross section model in a dynamic panel context:

$$Ineq_{it} = \beta_0 + \varphi \cdot Ineq_{it-1} + \beta_1 \cdot I_{it} + \beta_2 \cdot Q_{it} + \beta_3 \left(Q_{it} \cdot I_{it}\right) + \sum_{n=1}^{k} \phi_n \cdot X_{it,n} + \mu_i + \lambda_t + \omega_{it} \qquad (3)$$

Equation (3), again, suggests that the effect of protecting private property is conditional on democracy, and incorporates country fixed effects, μ_i, time-specific effects, λ_t (capturing common shocks), and an error term ω_{it}. But it also introduces a lag of the dependent variable. Therefore, a panel data approach requires a further refinement. The resulting FE estimates of φ would be, by construction, correlated with the error term, and are downward biased. This bias would be transmitted to the remaining variables – to the extent that they are correlated to it, thus inducing distortion in the other coefficients, including

[21] The idea of persistent inequality across generations has a long history. Piketty (2000) reviews the main mechanisms of intergenerational mobility (e.g., transmission of wealth, ability, imperfect capital markets).

(overestimation or underestimation of) the impact of institutions (depending on the direction of correlation).

Since we have a small-T-large-N panel, the size of this bias will not be negligible (as T increases, FE estimator is consistent). This problem can just as well be handled using Generalized Method of Moments (GMM) estimation. In a panel context, lagged values of the endogenous variables are valid instruments, as long as there is no (2^{nd} order) serial correlation in the disturbances. However, such procedures are data intensive and require a fairly large number of consecutive observations: a standard that inequality, and property rights, data does not accommodate. Assuming that the instruments are relevant and valid, the resulting loss of degrees of freedom would be large when exploiting lags to use the available moment conditions. We are constrained by the sample size instead. And only a few countries have as many as three adjacent observations for inequality.[22]

Notwithstanding, a dynamic approach is still feasible in this context. Several suggestions have been proposed to correct for the bias of the FE estimator (see Baltagi 2008: 147-148). In particular, Bruno (2005) extends previous results on bias approximation for finite samples by Bun and Kiviet (2003) to unbalanced panels. In its essence, this approach

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[22] Suppose, for example, we use the methodology proposed by Anderson and Hsiao (1982), i.e., to time difference (a simplified version of) equation (3) to remove country fixed effects:

$$\Delta Ineq_{it} = \Delta Ineq_{it-1} + \Delta y'_{it-1}\phi + \Delta \lambda_t + \Delta \omega_{it} \quad (4)$$

Such transformation consumes the first observation in each wave. Then equation (4) cannot be estimated consistently by OLS. But, in the absence of serial correlation in the original residual, ω_{it} (i.e., no second order serial correlation in $\Delta\omega_{it}$), $Ineq_{it-2}$ is uncorrelated with $\Delta\omega_{it}$, so can be used as instrument for $\Delta Ineq_{it-1}$ to obtain consistent estimates. Similarly, y_{it-2} is used as an instrument for Δy_{it-1}. It is easy to verify that such procedure rapidly leads our sample size to less than 80 observations when instrumenting $\Delta Ineq_{it-1}$ with two lags (in levels). In addition, we find that the instruments do not always show satisfactory relevance. This is actually a well-known problem daunting the practice of dynamic panels. Estimators relying on first-differencing to eliminate unobserved individual-specific effects will generate, with persistent series (close enough to random walks), first-differences close to innovations, and it will be unlikely that available lags identify the parameters of interest. Intuitively, they tend to be correlated very little with first-differences. Econometric theory has rapidly developed estimators that exploit additional moment conditions (see Baltagi 2008: 149-163). Although the Anderson-Hsiao estimator leads to consistent estimates, it is not efficient, since, under the assumption of no further serial correlation in ω_{it}, not only $Ineq_{it-2}$, but all further lags of $Ineq_{it}$ are uncorrelated with $\Delta\omega_{it}$, and can also be used as additional instruments. For example, Arellano and Bond (1991) develop a GMM estimator using all of these moment conditions. When they are all valid, this GMM estimator is more efficient than Anderson-Hsiao estimators. These and other estimators, which improved on them in recent years, are all the more infeasible. The literature is debating under what conditions one can add additional instruments, trading the loss of degrees of

first suggests an expression to measure the FE bias and, using Monte Carlo Simulations, considers three possible nested approximations of the bias. We correct for the most comprehensive one, B_3 (in the original notation).[23] This results in Least Squares Dummy Variable Corrected estimates (LSDVC), initialized by consistent estimates for dynamic models, Anderson and Hsiao (1982) estimator (with instrument in levels), which subtract the bias adjustments for each coefficient from FE estimates and apply bootstrapping to calculate the standard errors of the adjusted coefficients.

4.2.1 Results

Table 3 estimates (3) by OLS, *Within* FE and, in the last column, by LSDVC. In dynamic panel data models, OLS and FE are the 'upper' and 'lower bound' estimates of φ, respectively. They serve the purpose of assessing the bias (in φ, as well as β_2 and β_3) and allow comparisons with the adjusted estimates. In our case, β_2 and β_3 are underestimated by OLS, where lagged Gini is overestimated. The opposite holds for unadjusted FE estimates. LSDVC estimates fall in between, as expected. The effects of property rights protection and democracy on inequality are as expected, not just in the long run (as found in the cross-section estimates) but also when looking at their changes, as captured by FE estimator.

Table 3 [about here]

In a dynamic context, the 'short run' (5-year) impact of property rights on inequality is our usual partial effect as expressed by β_2 and β_3. This can now be distinguished from the long run multiplier. If causal, this estimate would imply that a one-unit strengthening of private property protection increases the 'steady-state' value of inequality by a cumulative, long run effect of $(\beta_2+\beta_3 I_{it})/(1 - \varphi)$. The bias-adjusted FE model suggests it is: (1.34-0.081*I)/(1-0.449), which is equal to 2.431, when evaluated at democracy first decile (which

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freedom with a potential increase in GMM efficiency (see Baltagi 2008: 164-169).

[23] In particular, with an increasing level of accuracy: $B^1 = c_1(T^{-1})$; $B_2 = B_1 + c_2(N^{-1}T^{-1})$; $B_3 = B_2 + c_3 (N^{-1}T^{-2})$, where c_1, c_2 and c_3 are parameters estimated via Monte Carlo simulations.

is zero). The corresponding effect for one standard deviation of property rights, instead, would be 3.35 Gini points. This effect is relatively large, bearing in mind that the mean of inequality in developing countries is 49.76. [24]

Note also that, since historically Vanhanen's index is zero in a nontrivial number of cases (31.24%) over the 1960-2000 period in developing economies, β_2 (and its corresponding long-run effect) can have an interpretation that is theoretically – as well as empirically – relevant for the 'short run' impact of property rights on inequality. However, a full assessment of the partial effects shall also look at when the moderating effect of β_3 is taken into account, i.e., when democratization takes values greater than zero. Based on the estimates of the LSDVC regression, in table 4, we have calculated significance and magnitude of the effects of property rights evaluated at different points of the democracy distribution for the whole sample of developing economies. We have substituted to β_3 the median score of democratization, its 1st and 4th quartile, as well as its 1st and top decile scores.

Table 4 [about here]

There is a positive effect when the partial effect of property rights is evaluated at the first decile and quartile of democracy (which is the same, as they are both zero) of 1.34 inequality points, for a one-unit increase in property rights. The effect of a one-standard deviation change in property rights (1.58 points) could trigger an increase of 2.12 Gini points in a five-year timeframe. The partial effect is still positive and marginally significant when democracy is at its median. For a relevant number of countries in the sample, there is an increase in inequality associated when property rights protection is greater. The partial effect is still positive when democracy is measured at its 3rd quartile, but is insignificant. Finally, when democracy at its top decile is plugged in, the partial effect switches sign to negative,

[24] Incidentally, the lagged inequality coefficient implies that, in a five-year period, developing economies close

but this is not statistically significant. It is interesting though. For it shows that only when countries achieve a high level of democracy do they have sufficiently representative systems to reverse the inequality-worsening effect of property rights regimes, or at least neutralize them. To put it another way, few countries seem to have equitable political institutions such that the partial effect of property rights institutions may be reversed to negative sign.

4.2.2 Further results on the role of democratization and robustness checks

The type of political environment could also affect the access to production factors: land and physical, financial and human capital. Developing democratic attributes – franchise extension, freedom of association, government accountability – could influence the functioning of the education system, the land and credit markets. Governments can be forced by the electoral process to design land reforms and regulate the credit market which would thus become less concentrated. Human capital can become affordable to the have-nots, in democracies, by promoting the acquisition of skills among different sectors of the population, improving the quality of education systems and public health care (e.g., Robinson 2001; Lake and Baum 2001; Baum and Lake 2003). Therefore, in democracies, the extent of education, land inequality and financial development can have a different impact than in non-democracies, in improving the poor's access to factors of production.

Table 5 [about here]

To test if the effect of property rights protection is actually picking the effect of such mechanisms, we have added the interaction terms of democracy with our proxy for asset inequality, financial development and education. We expect the effect of education and financial development will reduce income inequality, with such effects being stronger in more democratic systems; the effect of asset inequality will increase income inequality, but that this effect is weaker in democracies. Results are reported table 5, where we repeat the

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55.51% of the gap between the 'equilibrium' value of inequality and its current value.

same exercise as in table 3, when including all the hypothesized interaction terms of democracy. There is no evidence that democracy has an effect through education, financial development, and the distribution of assets. The only channel is through influencing the functioning of property rights rules, as the only significant interaction term of democracy is the one with the property rights protection index.

Another concern is that, if the property right index is correlated with the democracy index, their interaction could simply act as a proxy for the squared property rights index, hence mimicking the results in Chong and Calderon (2000). Similarly, if the correlation between our democracy indicator and the property rights indicator is sizeable, the interaction term could also act as proxy for the squared democracy term, hence mimicking the results published in Chong (2004) and Tam (2008). This should not be the case, as the correlation coefficient between the two variables is low (0.25). However, as an additional robustness test, we also re-estimate the LSDVC regressions when adding as further control the squared terms of the Vanhanen's index and Fraser property rights index (separately or together). The estimates, available on request, show that the key results of paper on the effect of property rights protection and its interaction with political democracy are unchanged (although collinearity inflates the standard errors of the property rights coefficient, which shows a VIF of 28.55 with its squared counterpart).

Further controls included variables on the effect of globalization and international trade on income distribution. To capture such effects, we performed the key regressions of the paper when including the KOF globalization index (as in Dreher and Gaston 2008) and the investment price level (as in Bjørnskov 2010). The results, available on request, show that the key results of paper on the effect of property rights protection and its interaction with political democracy are unchanged. The coefficients do not change sign or significance and their magnitude also is quite stable (while the additional controls are insignificant).

We have experimented with alternative *objective* democracy measures: the polichotomous Xpolity index by Vreeland (2008), which is based on Polity IV variables, and the dichotomous DD index by Cheibub et al. (2010). When using the Xpolity variable, we obtain similar results both in terms of sign and significance, while with the DD index the standard errors are too large to reach conventional levels of significance (although the p-values are not too far from such levels). Perhaps this is due to the fact that the DD is a dichotomic index (classifying countries in either democracies or dictatorships), and thus its variability is dramatically reduced. As a consequence, it fails to capture the nuances of democratic change that a continuous index would capture; hence, it does not express the mixture of authoritarian and democratic features of developing economies.

As a final robustness check, tables 3 and 5 regressions have also been estimated when excluding, in turn, the continents from the regression. Signs stay as expected in all cases. However, when excluding Latin American and Asian countries, our coefficients of interest loose significance at conventional levels. However, it must also be said that the sample size drops (sharply) to 64 and 86 observations respectively. Hence, it is difficult to tell if Latin America or Asia is crucial for the results because of their relevance to the hypotheses under investigation or simply because we have a loss of degrees of freedom. [25]

4.2.3 A closer look at the distribution of income

The results from the dynamic specification can also be analyzed for different segments of the distribution of income: the share of income accruing to the bottom and the

[25] Two further remarks are in order. Measurement error, as the discrepancy between our institutional indicators and the 'true' concept of institutions we would like to capture, could affect both property rights and democracy. If the noise can be approximated by classic errors in variables assumption (measurement error is uncorrelated with the true variable we would like to observe), this is a source of attenuation bias. Therefore, it stacks the odds against our results, implying that estimates of the partial effect of property rights are conservative. A remark on endogeneity is also due. One may argue that income inequality and property rights simultaneously affect each other or they could be linked over time by a feedback process (Keefer and Knack, 2002, and Chong and Gradstein, 2007). Although we share this concern, perhaps it is not a major drawback as we find no evidence of 2nd-order serial correlation in the residuals of any regressions above, suggesting that statistically these effects are not driving our results.

top quintiles and deciles, as well as the share of income accruing to the three middle quintiles. In this way, by looking at which groups or classes gain or loose, one is able to uncover the mechanics of the rise in inequality when reforming property rights institutions in developing economies. The regressions in table 6 and the related marginal effects (not reported here, but available on request) show that, in the absence of democracy, property rights institutions increase the share of income accruing to the upper classes (top quintile and decile), and decrease the share for the middle class (the sum of the three middle quintiles). This effect should be eroded when democracy increases. Moreover, there is no evidence of property rights regimes affecting the share of income accruing to the bottom quintile and deciles, which is interesting because it is also suggestive of the effects of economic institutions on poverty. Taken together, the results suggest that, in the absence of political equality, the mechanism leading to an increase in inequality is one where economic institutions render upper classes richer and impede the formation of a larger middle class, therefore leaving the middle and lower classes further behind. Increases in political equality may mitigate or even block such mechanisms. Yet, one must be cautious. Due to the reduced availability of income shares data in the WIDER database, such findings are based on panel regressions using a substantially lower number of observations than others where the dependent variable was the Gini index.

Table 6 [about here]

We have also extended the results of table 5 to the case of multiple interactions of democracy, to check if they might be affecting specific classes. The same observations of the foregoing discussion remain valid.

4.2.4 A note on the marginal effect of democratization

The paper has privileged, so far, the 'indirect effect' of democratization on the structure of property rights, i.e., the effect through which political democracy changes the

magnitude of the effect of property rights protection. For completeness, we should also consider the partial effect of democracy at different property rights levels, as the interaction term could be expressing the moderating effect of pre-existing economic institutions on the magnitude of the effect of democratization on income distribution in developing economies (rather than the moderating effect of democratization on property rights protection).

Recent literature has indeed reconsidered the idea that democracies are receptive to the claims of the poor and, as mentioned in section 2, there has been some discussion whether the expected redistributive effect of democratization increases inequality in developing economies. For instance, Bourguignon and Verdier (2000) argue that initially only part of the population benefits from democratization and predict that partial franchise extension can lead to an increase in inequality as the elite initially subsidizes schooling only for part of the non-educated. This reasoning can be extended to imply that the redistributive effect of democratization depends on the type of policies and expenditures undertaken, and the role of the state in extracting and allocating resources during the transition to democracy. For instance, while cash transfers to the poor reduce inequality, the benefits of other spending categories could accrue mainly to middle and upper classes. Lee (2005) discusses three mechanisms: a) the wage differential between the private and the expanding public sectors could be substantial; b) policies could grant lower taxes and expenditure can focus on building infrastructures for new industries; c) social policies (e.g., old age pension and health insurance) could be targeted to workers in the core industries of the formal sector.[26]

Last, and related to our argument, Bjørnskov (2010) puts forward, and presents evidence, that democracies in developing economies can increase inequality as they are prone to rent-seeking activities on the part of the local elite. Our econometric model would further

[26] Also, other factors are the current cultural and ideological climate. Policy and academic debates often put the emphasis on negative liberties rather than redistribution, when discussing the role of democracy. Nel (2005) argues that a neglected element in the analysis of political power is the ability to shape economic preferences

suggest that developing economies with strong economic institutions could be less prone to such effects. To corroborate this hypothesis, one has to evaluate the following marginal effect: $\partial Ineq/\partial I = \beta_1 + \beta_3 Q$. Below we have estimated magnitude and significance of such partial effect of democratization based on the LSDVC panel regression in table 3, the key results of the paper. Table 7 illustrates the effect of democracy, using Vanhanen's index, calculated at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles of the Fraser property rights index. The estimates show that the effect of democracy can decrease in magnitude and even change sign as economic institutions become stronger. However, there is no evidence that such effects are significant at the conventional levels.[27]

For robustness' sake, it is also interesting to calculate the marginal effect of democracy when the democracy measure is an alternative objective index, such as the Xpolity index by Vreeland (2008). The results of panel B in table 7 show that the effect of democracy can change sign as property rights protection becomes stronger. However, as in Vanhanen's index case above, such effects are never statistically significant.

Taken together with the evidence of table 4 (on the marginal effects of property rights protection), the evidence of table 7 does not support the view of differential effects of democratization (which would increase inequality in developing economies) depending on the level of economic institutions. Such results, instead, offer support to the view that the democracy-property rights interaction term is capturing the fact that the effect of property rights protection is conditional on the level of political democracy.

Table 7 [about here]

4.3 Discussion of results

FE evidence confirms our previous cross-section results and shows that positive

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through the Gramscian concept of *cultural hegemony*.

[27] We repeat the same exercise for income shares regressions (of table 6), finding very similar evidence.

changes in property rights protection are associated with a change in the same sign of income inequality. Moving towards a more democratic political system can counteract this effect. Hence, strengthening property rights regimes can increase the concentration of income into the hands of a few, especially in countries with poor levels of political equality. A closer look at the distribution of income reveals that property rights increase the income of top quintile and decile, and decrease the middle class share. An increase in democratization would counterbalance this, while we have weak evidence that property rights affect the share of bottom quintile and decile. The role of democracy seems to be an 'indirect' one, working only through property rights institutions. In fact, we find no evidence that democracy affects inequality by moderating the effect of financial development, education or forms of asset inequality.

Taken together, cross-section and panel data results show an interesting empirical regularity, which is robust to the extent that the effect of property rights does not result from the omission of any regional fixed effect, or historical or country-specific factor (as well as common shocks). We find that property rights institutions have an important distributional impact in developing economies. But such an impact is conditional on the level of democratization. However, one should not be tempted to make stronger claims. Since cross-section regressions do not control for country and time effects, the FE estimator is, in principle, an effective complement to cross section evidence; but it also removes all the important variation in income inequality. In addition, the limited sample size does not allow the assessment of issues of robustness or address endogeneity, as one would want to.

When relating to previous studies, our findings confirm the intuition that institutional factors are important determinants of inequality (Bowles 2004; Bourguignon et al. 2007). We also find support for the idea that the evolution of inequality along the process of development is nonlinear and is driven by the transformation of political and economic

institutions (Acemoglu and Robinson 2002; Piketty 2006). Whilst confirming that the impact of economic institutions is a hump-shaped one (e.g., Chong and Calderon 2000), we find that its heterogeneity is due to the moderating role of democratization. Finally, in relation to the debate on economic freedom and equity (Berggren 1999; Carter 2006; Scully 2002), our findings suggest that a trade-off between equity and economic freedom exists in developing economies, at least along property rights protection lines, but democratization can offset this.

Our findings complement some recent research on the interaction effects of institutions on inequality, when injecting foreign aid resources into developing economies. Bjørnskov (2010) presents evidence that foreign aid increases income inequality, as it benefits the richest quintile, and that such effects are higher in democracies. Chong et al. (2010), instead, find that aid has no effect in alleviating inequality or poverty, and that there is no robust evidence of such an effect in countries with lower corruption levels. Amongst the explanations considered, both papers also point to mechanisms whereby the elite appropriate aid resources through related rent-seeking activities. While in some respects this is similar to our argument, as we also speculate on institutional formation processes that favor elitist rent-seeking activities (e.g., access and control of key markets, and wage-setting policies), we find instead that in democratizing systems such inequality-increasing effects are smaller.

Since our property rights measures are an expression of how attractive the investment climate for foreign investors is, other causal mechanisms related to the injection of foreign capital in developing economies are perhaps also consistent with our findings. Dependency theory explanations of inequality argue that the penetration of and dependence on foreign capital is expected to increase income inequality by creating a dualistic occupational structure in developing economies, with a highly paid elite (in the international sector) and large groups of marginalized workers (left out of the international sector). For instance, in an economy with a large extractive sector (e.g., minerals, oil), foreign investment benefits only a

small portion of the national population and thereby increases income inequality. This is because foreign capital penetration in this sector creates only a small well-paid labor force and because ownership of natural resources is typically concentrated. Similarly, foreign capital investment in the agricultural sector, producing internationally traded commodities, destroys traditional production processes and leads to unemployment and over-urbanization through its capital-intensive means of organization (i.e., labor shedding, land enclosure). Secondly, these nation governments, motivated by the necessity of attracting and maintaining foreign investment, implement policies that decrease the power of labor and inhibit vertical mobility. These include tax concessions, guarantees of profit repatriation, and labor laws unfavorable to national workers. For example, foreign investment in a manufacturing sector which produces for the world market may lead to higher levels of income inequality, because profits in this sector are increased by the maintenance of a large low-wage labor force (Bornschier and Chase-Dunn 1985).

Where our findings may differ is on the fact that political transformation can counteract the worsening of inequality. However, this finding may also echo the position of another strand of the dependency theory, which identifies the state's capacity to control and regulate foreign capital penetration and activities within its borders or to use tax and social policies as the moderating factor to curb the raise of inequality (Lee, Nielsen and Alderson 2007). Democracies may be better able to mobilize their populations and demand reforms and policies which attenuate the impact of foreign capital penetration on income distribution.

5. Summary and conclusions

This paper has tried to bring together two hypotheses. Firstly that economic institutions can have a direct impact on income distribution. Secondly, the distributional impact of political institutions matters 'indirectly', as the extent of political power diffusion amongst citizens affects the functioning of economic institutions. Taken together, the two

hypotheses complement each other and express the idea that both political and economic rules are important for income inequality.

We test both hypotheses by estimating the effect of property rights protection and political democracy on income inequality, with a sample of developing countries. Using cross-section and panel data techniques, we estimate a model that embodies the possibility of interaction between political democracy and property rights protection measures. We find that property rights protection significantly increases the level of income inequality in the vast majority of developing countries, especially in low-democracy political environments. This suggests that such institutions tend to serve the interests of a minority in these economies. The inequality-increasing effect may be counterbalanced only in systems which are able to develop sufficiently inclusive political institutions. As the democratization process unfolds, this effect should be reduced, albeit to a limited extent, implying that more political equality modifies the functioning of property rights institutions and so eases economic inequality. The impact of democracy is channeled only through the property rights system. In fact, we find no evidence that democracy affects inequality by moderating the effect of financial development, education and asset inequality.

Our results support the view that, in the last decades, institutional arrangements in most developing countries have benefited the interests of dominant groups, thereby granting little opportunities for lower classes to enhance their capability to appropriate returns for the production factors they own. A limitation of our analysis is that it we are unable to assess the specific channels through which property rights affect inequality. This remains speculative – e.g., oligarchies' rent-seeking behavior and control of key markets, or labor markets depressing the labor share – and perhaps deserves further investigation.

The relationships we have identified highlight the importance of institutions in understanding economic development and may have some interesting policy implications.

Although stimulating investment, property rights systems may exacerbate inequality, in the long-run, to socially unsustainable levels. Therefore, designing reforms aimed at strengthening investment incentives cannot ignore the distributional consequences of institutional change. In particular, the policy maker should concurrently consider aspects of political equality (and its consolidation within the political system). The likely outcome of institutional development, with high-quality property rights institutions and consolidated democracy, could be attractive: improving the quality of political and economic institutions – property rights, in particular – could deliver both efficiency and equity.

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Appendix

Table A.1 List of countries

Asia (9)		JAM	Jamaica	ETH	Ethiopia
BGD	Bangladesh	MEX	Mexico	GAB	Gabon
IND	India	NIC	Nicaragua	GMB	Gambia, The
IDN	Indonesia	PAN	Panama	GHA	Ghana
MYS	Malaysia	PRY	Paraguay	GIN	Guinea
PAK	Pakistan	PER	Peru	GNB	Guinea-Bissau
PNG	Papua New Guinea	TTO	Trinidad & Tobago	KEN	Kenya
PHL	Philippines	URY	Uruguay	MLI	Mali
LKA	Sri Lanka	VEN	Venezuela, RB	MWI	Malawi
THA	Thailand	North Africa & Mid. East (7)		MRT	Mauritania
Latin America & Carib. (21)		DZA	Algeria	MOZ	Mozambique
ARG	Argentina	EGY	Egypt, Arab Rep.	NER	Niger
BOL	Bolivia	IRN	Iran, Islamic Rep.	NGA	Nigeria
BRA	Brazil	JOR	Jordan	RWA	Rwanda
CHL	Chile	MAR	Morocco	SEN	Senegal
COL	Colombia	TUN	Tunisia	SLE	Sierra Leone
CRI	Costa Rica	TUR	Turkey	ZAF	South Africa
DOM	Dominican Rep.	Sub-Saharan Africa (25)		UGA	Uganda
ECU	Ecuador	BWA	Botswana	TZA	Tanzania
SLV	El Salvador	BFA	Burkina Faso	ZMB	Zambia
GTM	Guatemala	CIV	Cote d'Ivoire	ZWE	Zimbabwe
GUY	Guyana	CAF	Central African Rep.		
HND	Honduras				

Table A.2 Descriptive statistics, cross-section sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Family farms land (%) 1988	58	43.431	16.907	8	73
Gini coeff. 1991-2005 (WIID)	58	45.510	8.428	28.9	63.18
ln(GDP) 1980	58	7.402	0.792	5.73	9.327
Prop. rights 1980-1990 (Fraser)	47	4.106	1.256	2.071	6.475
Prop. rights 1980-1990 (ICRG)	55	22.707	6.264	10.851	37.014
M2/GDP 1986-1990	58	46.057	103.164	0.868	798.42
Political rights 1972-1990	58	2.466	1.586	0.055	6
Democratization 1960-1990	58	5.437	5.952	0	21.817
Education (sec. enrolment rate) 1965	57	16.298	13.468	1	53
ln(wheat/sugar)	53	-0.019	0.149	-0.392	0.577

Table A.3 Descriptive statistics, panel data sample

Variable		Mean	Std. Dev.	Min	Max	Observations
Gini coeff.	overall	49.764	10.118	29.897	77.169	N = 120
	between		10.536	31.304	77.169	n = 42
	within		2.358	42.408	57.906	T-bar = 2.857
Bottom quintile share	overall	3.742	1.321	1.300	7.93	N = 72
	between		1.377	1.300	7.78	n = 30
	within		0.366	2.130	5.075	T-bar= 2.4
Top quintile share	overall	56.201	6.197	42.165	77.355	N = 72
	between		6.710	42.782	77.355	n = 30
	within		1.672	49.807	63.101	T-bar= 2.4
Bottom decile share	overall	1.297	0.585	0.257	3.43	N = 72
	between		0.603	0.257	3.19	n = 30
	within		0.171	0.608	1.746	T-bar= 2.4
Top decile share	overall	40.171	6.589	26.7	67.439	N = 72
	between		7.551	27.697	67.439	n = 30
	within		1.615	34.071	46.371	T-bar= 2.4
Middle class share	overall	39.943	5.125	21.066	51.2	N = 70
	between		5.656	21.066	49.922	n = 29
	within		1.367	34.632	45.281	T-bar = 2.413
Prop. rights (Fraser)	overall	4.716	1.300	1.583	7.407	N = 120
	between		1.113	2.439	6.556	n = 42
	within		0.821	2.090	6.539	T-bar = 2.857
Democratization (Vanhanen)	overall	13.187	9.166	0	40.76	N = 120
	between		7.842	0	31.3872	n = 42
	within		5.113	-10.779	22.72976	T-bar = 2.857
Education (years of schooling)	overall	1.157	0.599	0.122	2.796	N = 120
	between		0.588	0.122	2.15	n = 42
	within		0.254	0.364	2.577	T-bar = 2.857
Inflation (CPI)	overall	55.180	42.015	1.16e-09	150.148	N = 120
	between		34.017	0.300	138.127	n = 42
	within		30.292	-3.652	163.541	T-bar = 2.857
ln(GDP)	overall	7.327	1.085	4.940	8.955	N = 120
	between		1.093	4.983	8.847	n = 42
	within		0.168	6.565	7.882	T-bar = 2.857
M2/GDP	overall	38.109	22.445	8.186	119.625	N = 120
	between		20.139	8.186	107.288	n = 42
	within		9.667	-7.358	72.385	T-bar = 2.857
Asset inequality	overall	44.701	17.775	20	90.7	N = 120
	between		19.012	21.571	90.7	n = 42
	within		3.818	32.001	56.0016	T-bar = 2.857

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Tables

Table 1: Income inequality, property rights and democracy: cross-section estimates

Dependent variable: Gini coefficient, 1991-2000 (WIID)							
	1	2	3	4	5	6	7
Education 1965	-0.130	-0.218	-0.229	-0.257	-0.448***	-0.275**	-0.386***
	(0.130)	(0.144)	(0.154)	(0.170)	(0.120)	(0.117)	(0.090)
M2/GDP 1986-1990	-0.087	-0.061	0.036	0.058	0.145**	0.068	0.130**
	(0.054)	(0.056)	(0.068)	(0.070)	(0.054)	(0.060)	(0.049)
Family farms land (%) 1988	-0.192***	-0.173***	-0.088	-0.044	-0.008	-0.036	0.026
	(0.059)	(0.060)	(0.074)	(0.066)	(0.077)	(0.088)	(0.086)
ln(GDP) 1980	3.202	4.249*	6.476***	7.695***	7.971***	6.812***	5.818***
	(2.026)	(2.131)	(2.004)	(1.379)	(1.905)	(1.419)	(2.015)
Democ. 1960-1990	-0.348*	1.198*	1.011	1.042	1.523*		
	(0.206)	(0.680)	(0.608)	(0.695)	(0.825)		
Political rights 1972-1990						6.436***	5.891*
						(1.929)	(3.195)
Prop.Rights 1980-90 (Fraser)	1.335	3.045***	1.830*	2.166**	2.571**		
	(0.831)	(0.954)	(0.973)	(0.938)	(1.174)		
Prop.Rights 1980-90 (ICRG)						1.630***	1.641**
						(0.378)	(0.652)
Prop.rights * Democratiz.		-0.312**	-0.276**	-0.281**	-0.361**	-0.476***	-0.442**
		(0.121)	(0.109)	(0.120)	(0.156)	(0.120)	(0.201)
MENA			-5.307	-8.459**	-8.159**	-8.872**	-8.189**
			(3.670)	(3.110)	(3.985)	(3.629)	(3.828)
Sub-Saharan Africa			9.444***	9.985***	12.163***	7.393**	9.852***
			(3.366)	(3.305)	(2.993)	(3.419)	(2.968)
Latin America			5.653	6.541	11.985***	6.306	12.137***
			(4.288)	(4.570)	(3.637)	(5.159)	(3.897)
ln(wheat/sugar)				-4.115	1.543	-10.766**	-7.407
				(5.641)	(5.826)	(5.094)	(5.360)
Constant	31.502**	15.464	-7.532	-20.471	-29.471*	-28.002**	-26.661
	(14.791)	(17.420)	(17.341)	(12.348)	(15.851)	(10.649)	(16.703)
F-stat	9.416***	7.519***	9.456***	14.466***	9.515***	18.521***	9.109***
Adj. R-Sq.	0.338	0.373	0.520	0.601	0.685	0.617	0.690
Obs.	47	47	47	44	44	41	41
RMSE	6.791	6.608	5.782	5.391	5.319	5.144	4.978
Estimator	OLS	OLS	OLS	OLS	IRLS	OLS	IRLS

Note: *, ** and *** stand for significant at 10, 5 and 1% respectively, two-tailed test – Heteroskedasticity-Robust Standard errors in parenthesis. OLS specifications pass Normality test of residuals (Jarque-Bera test) and Ramsey RESET test (with square and cubic y-hat).

Table 2 Income inequality, property rights and democracy: cross-section estimates, robustness checks

Dependent variable: Gini coefficient (WIID), 1991-2000				
Excluded continent:	Latin America	Asia	MENA	SS Africa
	1	2	3	4
Education 1965	-0.188	-0.196	-0.316***	-0.114
	(0.202)	(0.139)	(0.082)	(0.110)
M2/GDP 1986-1990	-0.012	-0.085	0.030	-0.043
	(0.116)	(0.087)	(0.032)	(0.055)
Family farms land (%) 1988	-0.140	-0.134	-0.109*	-0.127*
	(0.214)	(0.084)	(0.056)	(0.066)
log(GDP) 1980	1.600	4.338*	6.987***	7.629**
	(3.339)	(2.378)	(1.275)	(2.760)
Political rights 1972-1990	12.471**	6.681***	7.738***	5.505
	(4.756)	(2.370)	(1.953)	(4.591)
Prop. rights 1980-1990 (ICRG)	3.442**	1.563***	1.946***	1.429*
	(1.307)	(0.549)	(0.480)	(0.727)
Prop. rights * Pol. rights	-0.875*	-0.479***	-0.578***	-0.397
	(0.403)	(0.154)	(0.123)	(0.272)
log(wheat/sugar)	-29.862*	-7.562	-11.631**	-15.669**
	(13.908)	(5.562)	(5.462)	(6.296)
Constant	-7.793	3.625	-23.218*	-25.355
	(22.690)	(20.102)	(11.507)	(27.551)
F-stat	6.080***	3.217***	17.495***	8.409***
Adj. R-Sq.	0.232	0.373	0.529	0.490
Obs.	21	33	38	32
RMSE	7.770	5.949	5.549	5.879

Note: *, ** and *** stand for significant at 10, 5, and 1% respectively, two-tailed test – Heteroskedasticity-Robust Standard errors in parenthesis. OLS specifications pass Normality test of residuals (Jarque-Bera test) and Ramsey RESET test (with square and cubic y-hat).

Table 3 Income inequality and property rights: dynamic model

Dependent variable: Gini coefficient (WIID)			
Estimation method:	OLS	Within FE	LSDVC
$Gini_{t-1}$	0.947***	0.282**	0.449***
	(0.043)	(0.137)	(0.127)
Education	-1.076	0.455	0.257
	(0.870)	(1.732)	(1.851)
M2/GDP	-0.010	0.004	-0.003
	(0.015)	(0.052)	(0.039)
Asset inequality	-0.029	0.230**	0.197**
	(0.039)	(0.095)	(0.092)
Property rights	0.318	1.409**	1.340**
	(0.697)	(0.659)	(0.668)
Democratization	0.080	0.380**	0.371*
	(0.177)	(0.144)	(0.204)
Prop.Rigths * Democratization	-0.030	-0.084***	-0.081**
	(0.035)	(0.030)	(0.038)
ln(GDP)	-14.301**	-3.385	-7.284
	(6.536)	(13.188)	(14.481)
$ln(GDP)^2$	0.968**	-0.037	0.254
	(0.461)	(0.988)	(0.995)
Inflation (CPI)	0.035	0.021	0.020
	(0.023)	(0.015)	(0.021)
Constant	54.286**	40.219	
	(20.879)	(45.325)	
Time effects	Yes	Yes	Yes
F-stat	70.831***	23.298***	
R-Sq.	0.891	0.541	
Obs.	120	120	120
Countries	42	42	42

Note: *, **, and *** stand for significant at 10, 5 and 1% respectively, two-tailed test – FE and Pooled OLS Standard errors, in parenthesis, are robust for arbitrary heteroskedasticity and clustering at the country level. LSDVC standard errors are calculated by bootstrapping (50 repetitions) – Time dummies are jointly significant.

Table 4 Partial effect of property rights at different stages of democratization

Democratization 1st decile (0)						
	Coef.	Std. Err.	z	P-value	95% Conf.	Interval
Marg. effect on Inequality	1.340	0.668	2.01	0.045	0.031	2.649
Democratization 1st quartile (0)						
	Coef.	Std. Err.	z	P-value	95% Conf.	Interval
Marg. effect on Inequality	1.340	0.668	2.01	0.045	0.031	2.649
Democratization median (3.16)						
	Coef.	Std. Err.	z	P-value	95% Conf.	Interval
Marg. effect on Inequality	1.085	0.579	1.87	0.061	-0.050	2.221
Democratization 3rd quartile (12.58)						
	Coef.	Std. Err.	z	P-value	95% Conf.	Interval
Marg. effect on Inequality	0.324	0.418	0.78	0.438	-0.495	1.144
Democratization 10th decile (18.52)						
	Coef.	Std. Err.	z	P-value	95% Conf.	Interval
Marg. effect on Inequality	-0.155	0.451	-0.34	0.730	-1.040	0.728

Note: observed quartile and decile values are in parentheses

Table 5 Income inequality and property rights: Dynamic model with additional democracy interactions

Dependent variable: Gini coefficient (WIID)			
Estimation method:	OLS	FE, within	LSDVC
$Gini_{t-1}$	0.926***	0.328**	0.514***
	(0.044)	(0.138)	(0.135)
Education	-3.461*	-0.941	-1.423
	(1.900)	(3.680)	(3.077)
M2/GDP	-0.003	-0.008	-0.015
	(0.039)	(0.105)	(0.081)
Asset inequality	-0.026	0.196***	0.158
	(0.055)	(0.068)	(0.104)
Property rights	0.794	1.492**	1.422**
	(0.643)	(0.590)	(0.674)
Democratization	0.124	-0.067	-0.140
	(0.242)	(0.323)	(0.437)
Prop.Rights * Democratization	-0.073**	-0.087***	-0.085**
	(0.031)	(0.031)	(0.039)
Education * Democratization	0.155	0.124	0.145
	(0.109)	(0.184)	(0.163)
M2/GDP * Democratization	0.000	0.001	0.001
	(0.002)	(0.004)	(0.004)
Asset inequality * Democrat.	-0.070	0.816*	0.924
	(0.369)	(0.443)	(0.572)
ln(GDP)	-12.182*	-10.637	-16.125
	(6.294)	(11.705)	(17.074)
$ln(GDP)^2$	0.827*	0.471	0.862
	(0.444)	(0.876)	(1.186)
Inflation (CPI)	0.031	0.021	0.021
	(0.023)	(0.015)	(0.022)
Constant	47.260**	65.036	
	(19.151)	(42.406)	
Time effects	Yes	Yes	Yes
F-stat	51.164***	35.753***	
R-Sq.	0.897	0.566	
Obs.	120	120	120
Countries	42	42	42

Note: *, **, and *** stand for significant at 10, 5 and 1% respectively, two-tailed test – FE and Pooled OLS Standard errors, in parenthesis, are robust for arbitrary heteroskedasticity and clustering at the country level. LSDVC standard errors are calculated by bootstrapping (50 repetitions). Time dummies are jointly significant.

Table 6 Income inequality and property rights: dynamic model, LSDVC estimates by income shares

Dependent variable:	1st quintile	5th quintile	1st decile	10th decile	Middle class share
$Inequality_{t-1}$	0.166	0.201	0.230*	0.275*	0.257
	(0.129)	(0.154)	(0.128)	(0.166)	(0.189)
Education	-0.587**	1.273	-0.295**	0.916	-0.583
	(0.265)	(1.312)	(0.128)	(1.405)	(1.226)
M2/GDP	0.006	-0.029	0.005*	-0.041	0.022
	(0.006)	(0.027)	(0.003)	(0.030)	(0.029)
Asset inequality	-0.060***	0.157*	-0.027***	0.108	-0.089
	(0.020)	(0.086)	(0.008)	(0.088)	(0.080)
Property rights	-0.116	1.789***	-0.005	2.004***	-1.535***
	(0.116)	(0.532)	(0.057)	(0.589)	(0.582)
Democratization	-0.039	0.347**	-0.009	0.357*	-0.267*
	(0.037)	(0.169)	(0.018)	(0.183)	(0.155)
Prop.Rights * Democrat.	0.007	-0.070**	0.001	-0.069**	0.057*
	0.166	0.201	0.230*	0.275*	0.257
ln(GDP)	-4.349	29.150	-3.753	32.639	-17.338
	(5.224)	(25.519)	(2.513)	(27.127)	(21.596)
$ln(GDP)^2$	0.353	-2.164	0.275*	-2.279	1.339
	(0.340)	(1.669)	(0.164)	(1.775)	(1.384)
Inflation (CPI)	-0.001	0.002	-0.000	0.004	-0.000
	(0.003)	(0.014)	(0.001)	(0.015)	(0.009)
Time effects	Yes	Yes	Yes	Yes	Yes
Obs.	66	66	66	66	65
Countries	28	28	28	28	27

Note: *, **, and *** stand for significant at 10, 5 and 1% respectively, two-tailed test. Standard errors are calculated by bootstrapping (50 repetitions). Time dummies are jointly significant.

Table 7 Partial effect of democratization at different levels of property rights protection

Panel A: using Vanhanen's index					
Property rights 1st decile (2.44)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	0.173	0.119	1.46	0.145	-0.059 0.406
Property rights 1st quartile (3.24)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	0.109	0.094	1.16	0.247	-0.076 0.294
Property rights median (4.33)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	0.020	0.068	0.30	0.762	-0.113 0.154
Property rights 3rd quartile (5.38)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	-0.064	0.061	-1.04	0.298	-0.184 0.056
Property rights 10th decile (6.15)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	-0.126	0.071	-1.77	0.077	-0.267 0.014
Panel B: using Xpolity index					
Property rights 1st decile (2.44)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	0.302	0.281	1.07	0.283	-0.249 0.854
Property rights 1st quartile (3.24)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	0.061	0.224	0.27	0.786	-0.378 0.500
Property rights median (4.33)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	-0.016	0.218	-0.08	0.940	-0.443 0.410
Property rights 3rd quartile (5.38)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	-0.192	0.229	-0.84	0.401	-0.640 0.256
Property rights 10th decile (6.15)					
	Coef.	Std. Err.	z	P-value	95% Conf.Interval
Marg. effect on Inequality	-0.323	0.257	-1.25	0.210	-0.828 0.182

Note: observed quartile and decile values are in parentheses

Figures

Figure 1 Inequality and democracy

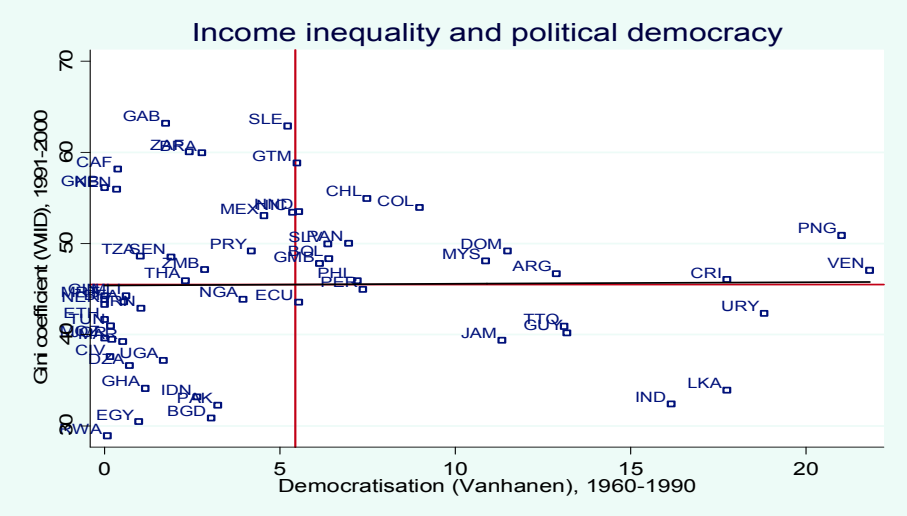

Figure 2 Inequality and property rights

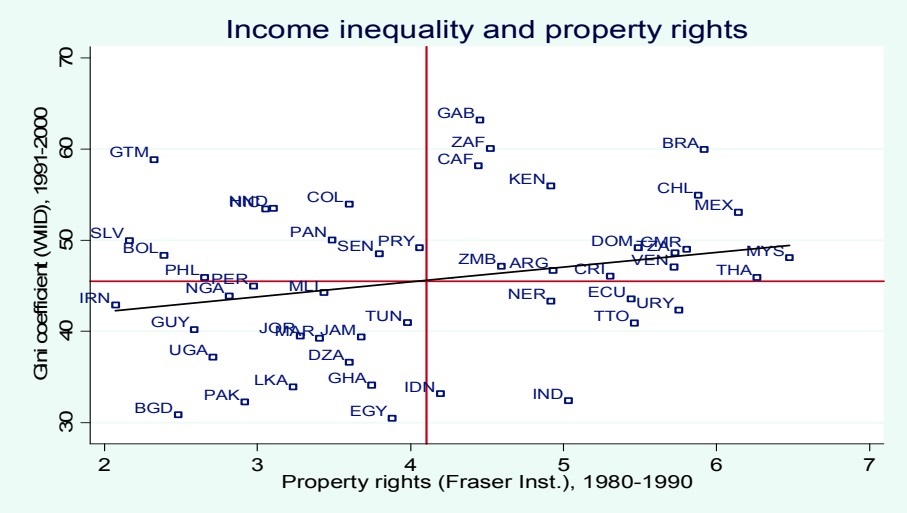

Figure 3 Inequality and property rights at advanced and early stages of democratization

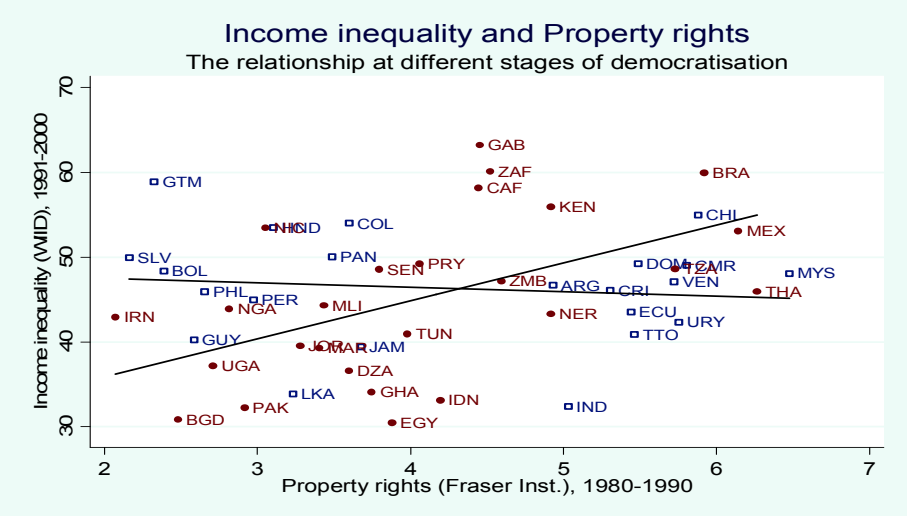

Figure 4 Partial effect of property rights at different stages of democratization